



INVESTIGATOR'S ANNUAL REPORT

United States Department of the Interior
National Park Service

All or some of the information you provide may become available to the public.

OMB # (1024-0236)
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Form No. (10-226)

Reporting Year: 2006	Park: Glacier Bay NP & PRES	Select the type of permit this report addresses: Scientific Study	
Name of principal investigator or responsible official: Lisa Etherington		Office Phone: 415-669-7494	
Mailing address: P.O. Box 645 Inverness, CA 94937 US		Office FAX Office Email letherington@usgs.gov	
Additional investigators or key field assistants (first name, last name, office phone, office email) Name: Mayumi Arimitsu Phone: 907-364-1593 Email: marimitsu@usgs.gov			
Project Title (maximum 300 characters): Glacier Bay Oceanographic Patterns			
Park-assigned Study or Activity #: GLBA-00058	Park-assigned Permit #: GLBA-2004-SCI-0005	Permit Start Date: Mar 01, 2004	Permit Expiration Date: Dec 31, 2010
Scientific Study Starting Date: Mar 01, 2004		Estimated Scientific Study Ending Date: Dec 31, 2010	
For either a Scientific Study or a Science Education Activity, the status is: Continuing		For a Scientific Study that is completed, please check each of the following that applies: <input type="checkbox"/> A final report has been provided to the park or will be provided to the park within the next two years <input type="checkbox"/> Copies of field notes, data files, photos, or other study records, as agreed, have been provided to the park <input type="checkbox"/> All collected and retained specimens have been cataloged into the NPS catalog system and NPS has processed loan agreements as needed	
Activity Type: Research			
Subject/Discipline: Coastal / Marine Systems			

Purpose of Scientific Study or Science Education Activity during the reporting year (maximum 4000 characters): The oceanographic patterns within Glacier Bay drive a large portion of the spatial and temporal variability of the ecosystem. A program that monitors oceanographic patterns is essential for understanding the marine ecosystem and to differentiate between natural variation and anthropogenic disturbance. The objective of this project is to study the spatial and temporal (seasonal and yearly) variation in a variety of oceanographic parameters, including salinity, temperature, water density, light levels, turbidity (sediment load), and chlorophyll-a (productivity).
Findings and status of Scientific Study or accomplishments of Science Education Activity during the reporting year (maximum 4000 characters): Findings and Status (maximum 4000 characters) 2006 represented the fourteenth year of field sampling for this monitoring program and consisted of three surveys of up to twenty three stations located throughout Glacier Bay. Sampling during 2006 was conducted during March, July and October. These time periods were chosen to represent spring bloom conditions (March), high chlorophyll-a levels (July), high stratification and turbidity

levels (July), and high precipitation conditions (October). In addition, these months were chosen to give consistency in the timing of sampling among years. At each of the twenty-three stations during each of the sampling times, a vertical profile of salinity, temperature, chlorophyll-a concentration (proxy for phytoplankton abundance), light penetration, and turbidity was taken at one meter intervals from surface waters to bottom depths (or maximum of 300m).

Past oceanographic surveys combined with 2006 sampling in Glacier Bay demonstrate that oceanographic characteristics of the surface waters are relatively similar from November to February, while the periods March through October represent the greatest change, both spatially and temporally (among months). The upper-fjord regions of the Bay, located the farthest from marine waters and closest to glaciers, are the areas of greatest change among months of the year for all measured physical oceanographic factors except water temperature. Noticeable differences in oceanographic properties have been detected between the East and West Arms of the Bay, potentially due to differences in weather patterns between these regions as well as differences in sources of freshwater input and sediment loads. Patterns of salinity and stratification appear to be largely driven by the seasonal cycle of freshwater discharge in southeast Alaska. High levels of freshwater discharge from upper Bay regions promote stratification from spring through fall, while strong tidal currents over shallow sills enhance mixing. Elevated levels of chlorophyll-a within the surface waters do not coincide with surface water stratification in May, but instead, an overall increase in chlorophyll-a occurs in March, most likely as a response to an increase in available light. Levels of chlorophyll-a increases from spring to summer and remains relatively high into the fall. Highest levels of chlorophyll-a within Glacier Bay are generally found within the central Bay and the lower reaches of the East and West Arms. These regions are likely favorable for phytoplankton populations due to intermediate stratification levels, higher light penetration due to decreased sediment concentrations in the water column, and nutrient regeneration.

For Scientific Studies (not Science Education Activities), were any specimens collected and removed from the park but not destroyed during analysis?	
No	
Funding specifically used in this park this reporting year that was provided by NPS (enter dollar amount):	Funding specifically used in this park this reporting year that was provided by all other sources (enter dollar amount):
\$0	\$17500
List any other U.S. Government Agencies supporting this study or activity and the funding each provided this reporting year:	

<p>Paperwork Reduction Act Statement: A federal agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. Public reporting for this collection of information is estimated to average 1.625 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the forms. Direct comments regarding this burden estimate or any aspect of this form to Dr. John G. Dennis, Natural Resources (3127 MIB), National Park Service, 1849 C Street, N.W., Washington, DC 20240.</p>
